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EXAMINER

WARREN, MATTHEW E

ART UNIT PAPER NUMBER

2815

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Please find below and/or attached an Office communication concerning this application or proceeding.



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**MAILED**  
**DEC 11 2006**  
**GROUP 2800**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/608,791  
Filing Date: June 26, 2003  
Appellant(s): JACKSON ET AL.

**MAILED**  
**DEC 11 2006**  
**GROUP 2800**

Robert W. Bergstrom  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed September 1, 2006 appealing from the Office action mailed March 24, 2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 1-32.

The appellant's arguments with respect to Chow (US 6,649,903) are persuasive. The 35 USC 102 Rejection of claims 1-3, 14, 15, and 28-32 over Chow (US 6,649,903) is therefore removed. No other rejection was made for dependent claims 28-31.

Claims 28-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Therefore, only claims 1-27 and 32 are finally rejected.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: Claims 1-27 and 32 are the only claims finally rejected. Claims 28-31 are now objected to as depending upon a rejected base claim.

**WITHDRAWN REJECTIONS**

The following grounds of rejection are not presented for review on appeal because the examiner has withdrawn them. The rejection of claims 1-3, 14, 15, and 28-32 over Chow (US 6,649,903).

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US Pub. 2003/0230746 A1	Stasiak	12-2003
US Pub. 2004/0246768 A1	Krieger et al.	12-2004

Gold, Victor, "Gold Book, Compendium of Chemical Terminology" First Edition published in 1987, pgs. 1-5. Excerpts were found on Wikipedia website;  
[http://en.wikipedia.org/Chemical\\_reaction](http://en.wikipedia.org/Chemical_reaction).

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Stasiak (US Pub. 2003/0230746 A1).

In re claim 1, Stasiak shows (figs. 1a-1b) an organic polymer based memory element comprising two overlapping conductive signal lines (140 and 130) and at least one organic polymer layer (120) within the region of overlap between the two signal

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lines, the organic polymer layer having at least two detectable memory states [0019], transitions between which arise from one of changes in chemical bonds and changes in organic polymer doping [0023].

Claims 1-27, and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Krieger et al. (US Pub. 2004/0246768 A1).

In re claim 1, Krieger et al. shows (figs. 1-6) an organic polymer based memory element comprising two overlapping conductive signal lines (upper electrode and lower electrodes 1 and 2) and at least one organic polymer layer (active layer 3) within the region of overlap between the two signal lines [0019], the organic polymer layer having at least two detectable memory states, transitions between which arise from one of changes in chemical bonds and changes in organic polymer doping [0019].

In re claim 2, Krieger discloses [0019] that in the first memory state, the organic polymer exhibits a first electrical resistivity, in the second memory state, the organic polymer exhibits a second electrical resistivity lower than the first, and the element is inherently an antifuse type memory element.

In re claim 3, Krieger discloses [0019] that the memory-state transition is initiated by applying to the memory element state-transition facilitating agents such as electrical voltage.

In re claims 4-13, Krieger shows [figs. 1-5] that the organic polymer layer is adjacent an additional layer (passive layer 5). The organic polymer layer and additional

layer inherently have all of the memory-state transition properties of the claims because the structure and materials are the same as those of the claimed invention.

In re claim 14, Krieger discloses [0019] that in the first memory state, the organic polymer exhibits a first electrical resistivity, in the second memory state, the organic polymer exhibits a second electrical resistivity higher than the first, and the element is inherently a fuse type memory element.

In re claim 15, Krieger discloses [0019] that the memory-state transition is initiated by applying to the memory element state-transition facilitating agents such as electrical voltage.

In re claims 16-25, Krieger shows [fig. 5] that the organic polymer layer is adjacent an additional layer (passive layer 5). The organic polymer layer and additional layer inherently have all of the memory-state transition properties of the claims because the structure and materials are the same as those of the claimed invention.

In re claims 26 and 27, Krieger discloses that upon application of a switch, the memory element irreversibly transitions from the first memory state to the second memory state [0045] or reversibly transitions from the first memory state to a second memory state and back to the first memory state with a second switch [0050] since a switching means is inherently used to turn the voltage on or off.

In re claims 32, Krieger discloses [0002] that the invention pertains to a computer system comprising a processor and memory having a number of memory elements.

The appellant's arguments against Chow are persuasive. Therefore, the rejection of claims 1-3, 14, 15, and 28-32 over Chow (US 6,649,903) is withdrawn.

#### **(10) Response to Argument**

The appellant primarily argues (1) that the Affidavit submitted on July 15, 2005 is sufficient to overcome the Stasiak reference. The appellant also argues (2) that Stasiak and Krieger do not show all of the elements of the claims. The examiner believes that the rejections are still proper and discloses all of the limitations of the claims.

(1) In re the arguments that the Rule 131 Affidavit submitted on July 15, 2005 properly shows conception and reduction to practice of the current invention prior to June 14, 2002 (the filing date of the Stasiak Publication), the examiner still believes that such document is not sufficient to overcome Stasiak. The appellants assert in the appeal brief only that "the exhibits show a variety of different data collected from experimental investigation of memory devices, or switches, fabricated from organic polymers and overlapping conductive materials." The applicant further adds that the Exhibit 1 shows families of voltage curves, that Exhibit 3 discusses a memory element comprising PTCDA sandwiched between a p-silicon substrate and gold contact, that Exhibit 4 shows the illustration of changes observed in a cathode of a memory element, and that Exhibit 8 shows another example of a diagram of a memory element. However, the examiner cannot ascertain these asserted descriptions due to the fact that none of the figures, drawings and graphs are properly labeled with the term "Exhibit 1, 2, 3, etc."



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There is no explanation of the figures, drawings, and graphs in the affidavit so one of ordinary skill in the art would not be able to determine what the invention is. For instance, the first page of the exhibits, labeled with a 1 and a circle around it (assumed to be Exhibit 1) shows a graph with the title 150 nm PTCDA. The Y and X axis are labeled current and voltage respectively. The appellant claims that Exhibit 1 shows a current/voltage curve obtained by measuring the current through memory-element embodiments of the PTCDA organic layer sandwiched between aluminum and silver electrodes. However, the legend of Exhibit 1 recites "Al//Si (n+ip+)/PTCDA 1500 Å)." It seems that Aluminum (Al) and Silicon (Si) [not Silver (Ag)] are somehow a part of this graph, but it cannot be determined if the PTCDA layer is formed between electrodes. The legend could be interpreted as meaning that the PTCDA layer is doped with aluminum and silicon. On page 6 of the Exhibits, labeled 3 with a circle around it (assumed to be Exhibit 3), the description only states that a PTCDA layer is formed on a p doped silicon (p-Si) with an gold (Au) top contact. The Exhibit is entitled "Shelf-test (PTCDA)." The Exhibit does not specifically mention that a memory device is formed using the PTCDA layer. The exhibit only mentions the results of testing the PTCDA layer on an electrode. The pages pertaining to what is assumed to be Exhibit 4 (page with 4 and a circle around it) disclose stressing an organic material. The first page of what is assumed to be Exhibit 8 ("Overview: Conductivity of PEDT:PSS films") do in fact show a diagram of a PEDT/PSS layer sandwiched between an Au and ITO layer as the appellant argues. However, the disclosure of that exhibit only describes preparation and testing of the device. Just because one generates current/voltage curves for a device

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does not specifically mean that a memory device has been formed. It may simply mean that one is testing the properties of a material/device. In this case, the current/voltage curves of the appellant's affidavit appear to only show the properties of the inventive organic polymer layer, said voltages applied via aluminum and silicon electrodes. There is nothing in that disclosure that would lead one of ordinary skill in the art to determine that the device is a memory element.

In essence, at best the examiner can only determine that the appellant invented an polymer layer (in this case the PTCDA layer). There is no evidence of conception of a memory device having the PTCDA polymer layer or the reduction to practice of a memory device having the PTCDA polymer layer. The instant invention pertains to an organic-polymer-based memory element comprising: at least two overlapping conductive signal lines; and at least on organic polymer layer within the region of overlap between the two signal lines. As stated in the previous rejections since the filing of the Rule 131 Affidavit, there is nothing in the evidence that suggests the reduction to practice of an organic-polymer based memory element. The Responses to the Affidavit have clearly recited the examiner's reasons for the rejection. Therefore, the rejection of the Affidavit is proper and Stasiak is a citable reference.

The rule requires that applicant make an oath to facts establishing the requisite conception plus reduction to practice before the date of the reference, conception plus diligence up to the reduction to practice, or conception plus diligence up to the filing of the application. Here, the affidavit is completely devoid of facts from which these conclusions can be derived. Regarding conception, the affidavit describes the rule,

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indicates that documents are attached, and says nothing more than "From these documents and/or models, it can be seen that the invention in this application was made at least by the date of Stasiak." As such, no specific facts are actually established from which a conclusion can be made that conception occurred. For diligence, there is a statement that a time line is attached, however, no timeline is presented nor activities described, so absolutely no facts are established from which a determination can be made that appellant was diligent.

Further, in reviewing the drawings and attempting to guess what facts may be supportable by those drawings, no indication of memory states are found and no evidence is presented that the missing limitations are obvious, so the claimed invention is not met by the conception.

In re appellant's arguments on page 8-9 regarding the conception being shown because there are two resistance states, it is noted that the claims require "two overlapping conductive signals lines; and at least one organic polymer layer within the region of overlap between the two signal lines, the organic polymer layer having at least two detectable memory states, transitions between which arise from one of changes in chemical bonds and changes in organic polymer doping. There is no evidence of recognition of memory states, the lines being signal lines, or transitions between which arise from one of changes in chemical bonds and changes in organic polymer doping. In fact there are no statements in the affidavit at all about what is shown, so there is nothing we can do but guess at what the drawings represent. In fact, no specific drawing can be identified as having an associated date, as the drawings are

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unlabeled. So, there is no way to tell which drawings if any correspond with any of the exhibits 1-8 because the affidavit has not asserted any correspondence.

(2) In re the arguments that Stasiak and Krieger et al. do not show the "organic polymer layer having at least two detectable memory states, transitions between which arise from one of changes in chemical bonds and changes in organic polymer doping" the examiner believes that the references disclose the elements of the claims. For Stasiak, the appellant specifically asserts that the transitions between the at least two detectable memory states arise from changes in the accumulation of charge or polymer orientations but not changes in one of chemical bonds or organic-polymer doping. The examiner believes that Stasiak discloses the limitations in question. In [0023] of Stasiak specifically recites:

"Charge transport, in the form of hole or electron transport, may occur between adjacent donor or acceptor molecules, respectively. Such a process can be described as a one-electron oxidation or reduction process between neutral functional groups and their charged derivatives."

In essence, Stasiak discloses that molecules of the organic polymer layer accept or donate holes or electrons in an oxidation or reduction process. The exchange of electrons is known as a chemical reaction and a chemical reaction is known as a change in the chemical bonds of the molecules. As a teaching reference, permitted by the MPEP 1207.03 (III), Victor Gold ("Gold Book, Compendium of Chemical Terminology") is cited to define a change in chemical bond (or chemical reaction. Gold states on the first page in the first paragraph that:

“...chemical reactions encompass changes that strictly involve the motion of electrons in the forming and breaking of chemical bonds....On the classical definition, therefore, there are only two types of chemical reaction: redox reaction and acid-base reactions.”

A redox reaction is also known as an oxidation reduction reaction. Again, Stasiak mentions in [0023] that the accumulation of charges in the layer is the result of a oxidation or reduction process (redox reaction) which is a type of chemical reaction, which in turn is a change in chemical bond. Therefore, Stasiak properly discloses that limitations of claim 1, and the rejection is proper.

In re the arguments against Krieger, the examiner believes that Krieger also discloses the limitations in question. Krieger not only discloses in [0019] a wide variety of materials of the active layer of the polymer memory device, but a wide variety of implementations of the device. In particular lines, Krieger states in [0019] that it is beneficial to implement the memory cell function zone “...with donor and acceptor molecules...and/or with molecules which can dissociate in an electric field and/or under light radiation...” As stated above, a change in chemical bonds or a chemical reaction involves the motion of electrons. The donating and accepting of molecules or the dissociation (separation) of molecules in an electric field and/or under light radiation is a change in chemical bond. The mere fact alone that molecules are separated in an electrical field means that the chemical bond between the molecules has been broken, therefore the chemical bond has been changed. Furthermore, Krieger's device operates in the same manner as the appellant's claimed invention. As stated in claim 2, Krieger's device exhibits a first electrical resistivity in a first memory state and a second electrically resistivity in a second memory state [0018]. The appellant also admits this at

the bottom of page 12 of the appeal brief. Because the materials and structure of Krieger are the same as the appellant's claimed invention and the methods of operation for Krieger are the same as the appellant's claimed invention, it is inherent that the transitions between the detectable memory states also occur due to changes in chemical bonds or changes in organic polymer doping.

Although Krieger does not specifically mention that the state change is reversible (in that exact term), the claims do not require that the detectable memory state change is reversible. The argument is irrelevant as it pertains to claim language. Even if the claims did require that the detectable memory state change is reversible, the same argument for inherency can be made. Because the materials and structure of Krieger are the same as the appellant's claimed invention and the methods of operation for Krieger are the same as the appellant's claimed invention, it is inherent that the memory state change is reversible. Krieger does not use the term "reversible," but Krieger does suggest that the memory state change is reversible because the device can be programmed, read, and erased [0053, last sentence or 0055, 0056]. A first memory state change occurs during the programming step (writing a 1 or a 0 to the memory cell) while the reversed memory state change occurs during the erasing step (changing back to the preset condition of 0 or 1). The mere fact that Krieger also has the ability to reverse the state change of the memory cell is further evidence that the device of Krieger functions in the same way as the appellant's claimed invention. It has been shown that the structure is the same, the materials are the same, and the capabilities of Krieger's memory device are the same.

On page 13 of the appeal brief, the appellant argues against Chow. As stated above, the examiner has withdrawn all rejections over Chow and the appellant's arguments in re Chow are now moot.

The appellant further argues that Krieger does not disclose the limitations in which the organic polymer dopants are active in one memory state and inactive in another memory state. In re the additional arguments pertaining to the rejection of claims 4-13, Krieger at least discloses that the organic polymer includes the dopant entities and additional layers. In [0039 and any of figs. 1-8], Krieger specifically discloses doped ions (3), electrolyte clusters (3a), or two active doped layers (3b and 3c). Again, since the materials and structure of Krieger are the same as the appellant's claimed invention and since the operation of the memory device of Krieger is the same as the appellant's claimed invention, then the memory device of Krieger also inherently has the same behavioral characteristics and properties as the appellants claimed invention. In this case, Krieger's device comprises dopants, has the same structure, and has the same capabilities (change in detectable memory states, reversal of the memory state change, etc.), therefore the dopants are inherently active in one memory state and inactive in another memory state.

The appellant asserts on page 14 of the appeal brief that the structure, characteristics, and properties of the organic polymer materials "depend critically on methods of preparing the materials, concentration of the dopants and other additives, polymer-chain lengths, ... and many different additional characteristics." Although it is agreed that such characteristics and properties may depend on the factors listed, the

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claims themselves do not specifically state any methods, concentration, etc. limitations that distinguish the structure from Krieger's memory cell. For instance, claim 4 states that the organic polymer layer includes dopant chemical entities which are "inactive in the first memory state and active in the second memory state." In summary, the limitation basically pertains to how the device operates. The only distinguishing structural limitation of claim 4 is the dopant chemical entities in addition to the organic polymers. Krieger's figures 1-5 and their associated text disclose [0055, 0057] the additional dopant chemical entities ("doped with lithium ions" [0055]) and layers of the instant invention. It has been explicitly shown that the structure is the same, the materials are the same, and the capabilities of Krieger's memory device are the same as the appellant's claimed invention. Since these things are all the same, then the behavioral and operational characteristics of Krieger's invention are the same as the appellant's claimed invention. The same argument is made for the remaining dependent claims 5-13. Therefore, the limitations of claims 4-13 have also been met by Krieger and the rejection is proper.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.



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For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

MEW

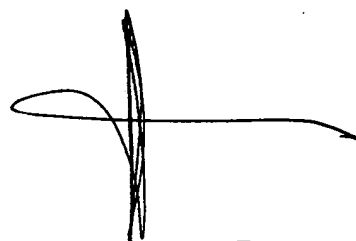
*MEW*

Conferees:

Ken Parker, SPE of AU 2815 <sup>P</sup>

A handwritten signature in black ink, appearing to read 'D. Blum', with a long horizontal line extending to the right.

David Blum, SPE

A handwritten signature in black ink, featuring a large, stylized 'K' or 'P' shape with a horizontal line extending to the right.

SPE Kenneth Parker